# OHIO PLANTS WITH DISSECTED LEAVES.

HARRIET G. BURR.

An ordinary plant is dependent upon light for its nutrition; and, since the leaf is the organ in which the food is mainly manufactured, it follows that the leaves are arranged in such a way as to give them as much light as possible without causing injury to their structure. Under ordinary circumstances they have an expanded blade which presents a large amount of surface in proportion to the mass. Whenever this is not the case we look for something in the environment to explain the departure from the usual condition.

There are plants which, typically, have leaves of a certain form, but which, when grown in a different situation, produce leaves of an entirely different character. Plants which grow in very dry regions and also in moister regions have a typical form of leaf for each condition. The same is true of those plants which grow sometimes submerged in water and sometimes on dry land. In the case of many plants which grow with a part submerged and a part above water, each will have its own form of leaf. Submerged plants invariably produce the most finely dissected leaves; plants which grow in crowded or in very dry situations also usually produce much-divided leaves.

Below are shown lists of the more typical Ohio plants which have leaves of this kind. The first list comprises those which grow in water; the second, those which grow in dry land, whether in dry or moist soil.

One of the most striking of the water plants is *Bidens Beckii* or Water Marigold. The submerged leaves are very finely dissected, the plant blooms above water, and the upper leaves are above water; all these latter leaves are simple and undivided. The second list is necessarily more heterogeneous than the first, including plants found in moist, rich woods, in waste places, and on roadsides, in dry, hot situations, and so forth.

The cause ordinarily given for the dissected leaf under these conditions is the adaptation to secure as much light as possible for those which grow in crowded situations, and to reduce transpiration as much as possible for those in dry conditions. Where plants are crowded together, as they are sometimes along our roadsides, a simple entire leaf would shade those beneath it, whereas compound and dissected leaves allow the light to sift through them and so reach those below.

Finely dissected leaves are much better adapted to a water medium than leaves with undivided or with large blades would be; and it is this adaptation, together with the response to diminished

light, differences in nutrition, temperature, and so forth, which is the commonly accepted explanation for the form of submerged leaves. This explanation, however, is too general to be entirely satisfactory. In this connection, McCallum* has been conducting experiment with *Proserpinaca palustris,* at the Hull Botanical Laboratory. These experiments seem to indicate that the heretofore accepted explanation based upon diminished light, nutrition, and so forth, will not hold good. It appears that the only constant factor in all cases where the water form develops is the checking of transpiration and the increased amount of water in the protoplasm. Whatever the inciting cause may be, it seems that this condition brings out a certain set of hereditary characters while the absence of it produces a different set; just as a root in the soil is a typical root, but when growing above the ground may sometimes produce buds and leaves.

IN WATER.

Ceratophyllum demersum—in ponds and slow streams.
Ranunculus delphinifolius—in ponds.
Batrachium tricophyllum—in ponds and streams.
Batrachium divaricatum—in streams.
Roripa Americana—in lakes and slow streams.
Podostemon ceratophyllum—in shallow streams.
Floerkea proserpinacoides—in marshes and along rivers.
Proserpinaca palustris—in swamps.
Myriophyllum spicatum—in deep water.
Myriophyllum verticillatum—in both deep and shallow water.
Myriophyllum tenellum—on sandy bottoms of ponds and streams.
Myriophyllum heterophyllum—in ponds.
Conioselinum Chinense—in cold swamps.
Hottonia inflata—in shallow stagnant ponds.
Utricularia vulgaris—in brooks and ponds.
Utricularia intermedia—in shallow water along margins of pools and ponds.
Utricularia minor—in shallow ponds and bogs.
Utricularia gibba—in shallow water or in mud on borders of ponds and pools.
Bidens Beckii—in ponds and streams.

ON DRY LAND.

Delphinium consolida—in waste places.
Delphinium Carolinianum—on prairies and open grounds.
Bicuculla cucullaria—in woods.
Bicuculla Canadensis—in rich woods.
Capnoides flavulum—in rocky woods.

* W. B. McCallum. On the Nature of the Stimulus causing the Change of Form and Structure in *Proserpinaca palustris.* Bot. Gaz. *34*: 93-108, 1902.

Fumaria officinalis—in waste places and on ballast.
Sophia pinnata—in dry soil.
Potentilla argentea—in dry soil.
Kuhnistera purpurea—on prairies.
Geranium columbinum—in fields and along road-sides.
Geranium dissectum—in waste places.
Erodium cicutarium—in waste places and fields.
Viola pedatifida—on prairies.
Viola pedata—in dry fields and on hillsides.
Daucus carota—in fields and waste places.
Caucalis anthriscus—in waste places.
Foeniculum foeniculum—in waste places.
Eulophus Americanus—in dry soil.
Chaerophyllum procumbeus—in moist ground.
Carum carui—occasionally in waste places.
Ptilimnium capillacea—in wet soil.
Erigenia bulbosa—in woods.
Quamoclit quamoclit—in waste and cultivaled ground.
Conobea multifida—along streams and rivers.
Ambrosia artemisiaefolia—in dry soil.
Coreopsis tinctoria—in moist soil.
Coreopsis verticillata—in dry soil.
Dysodia papposa—along streams and roadsides.
Achillea millefolium—in various situations.
Anthemis cotula—in fields, waste places and along roadsides.
Anthemis arvensis - in fields and waste places.
Matricaria inodora—in waste places.
Matricaria chamomilla—in wast places and on ballast.
Matricaria matricaroides—in waste places, on ballast, and along railroads
Tanacetum vulgare - along roadsides.
Artemisia caudata—in dry sandy soil.
Artemisia canadensis—in rocky soil.
Artemisia abrotanum—in waste places.
Artemisia annua—in waste places.